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ORIGINAL MEMOIRS.

PLASTIC RESECTION OF THE MAMMARY GLAND.

BY J. COLLINS WARREN, M.D.,
OF BOSTON, MASS.,
Professor of Surgery in Harvard University.

THERE has been so much difference of opinion among surgical authorities as to the treatment of benign tumors of the mammary gland, that this branch of the surgery of the breast has not kept pace with the improvements in operations for mammary cancer.

Once a diagnosis of non-malignant disease has been made, it often happens that no further treatment is thought necessary. On the other hand, many physicians think it wise to advise amputation of the breast for every tumor of doubtful nature. This situation has largely developed from an inadequate knowledge of the various tumors which grow in the mammary gland, and the relation of these tumors, and other morbid conditions of the breast associated with the involution of that organ, to what may be called precancerous stages. There is, however, a growing feeling that this difference of opinion is unnecessary,[1] and that some well defined policy should be adopted which would be more on a par with the present well recognized treatment of cancer of the breast.

It was with this end in view that my paper on classification of tumors of the breast was prepared,[2] and an operation was referred to which it is intended to describe a little more in detail in the present paper.

The operation is designed to take the place of those exploratory incisions which are often inadequate for the purpose, or are so situated as to leave a cicatrix in a part of the integument frequently exposed to view. It is also so planned as to expose freely every portion of the gland, and, therefore, to accomplish all that an amputation would in doubtful cases. An operation which can relieve the mind of the patient from all uncertainty as to diagnosis, produces no subsequent deformity and entails but little discomfort and sacrifice of time, seems well indicated as a substitute for the various forms of treatment which have from time to time been suggested—such as puncture, aspiration or small exploratory incisions. It is also well adapted to overcome the fears of those who shrink from any operative interference whatsoever.

It was doubtless with this idea in mind that Thomas[3] recommended the incision which has since borne his name. In his short, but admirable paper, he points out quite clearly the relief from apprehension which such an operation gives, the slight exposure to risks, and the avoidance of all mutilation of person. His operation was substantially as follows:

> "The patient standing erect and the mamma being completely exposed, a semi-circular line is drawn with pen and ink exactly in the fold which is created by the fall of the organ upon the thorax. This line encircles the lower half of the breast at its junction with the trunk." The incision being made along the line, the lower half of the mamma is turned upward and laid upon the chest wall just below the clavicle. "An incision is then made upon the tumor from underneath, a pair of short vulsellum forceps firmly fixed into it, and while traction is made by these its connections are snipped by scissors, the body of the tumor being closely adhered to in this process, and the growth is removed." Thomas calls attention to the absence of a depression in the breast following the operation, although no attempt at suturing the wound in the gland has been made.

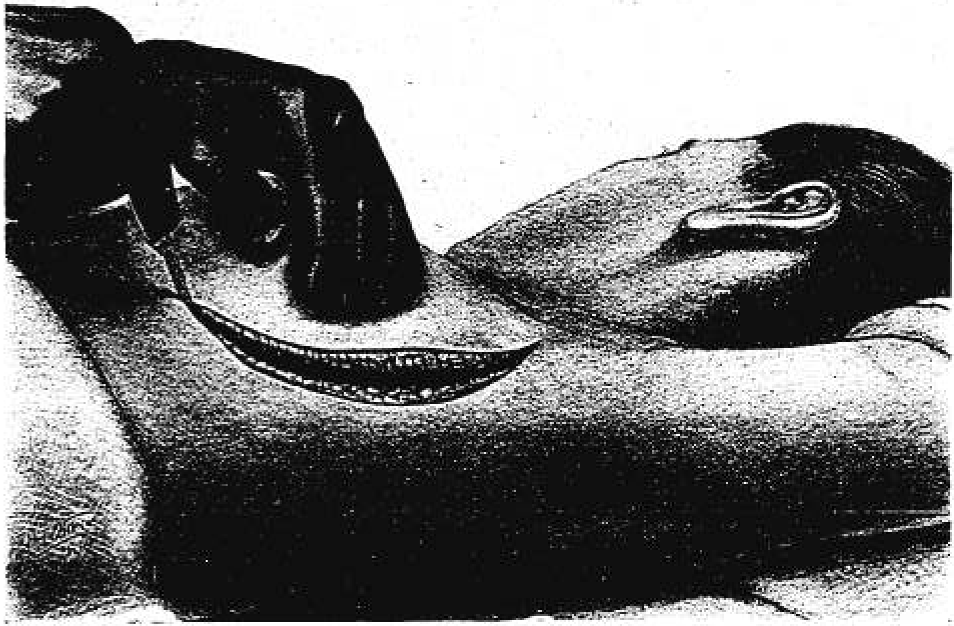
In early operations I began with an incision similar to that described by Thomas, but have changed it to coincide with the edge of the outer hemisphere, as this incision gives a freer access to the upper hemisphere and at the same time to the outer hemisphere of the gland, regions more frequently the seat of tumors than the inner quadrants. (Fig. 1.) By prolonging the incision slightly along the anterior axillary border, the breast can be thrown over towards the sternum, and the most remote regions of the gland freely exposed. As the breast falls not only downward but outward, when the patient is in the upright position, this incision is concealed from view.

The dissection should be carried down to the outer edge of the pectoralis major muscle; when the fibres of this muscle have been exposed the knife will have passed through the deep layer of the superficial pectoral fascia, a fascia which covers the posterior surface of the gland. This layer is separated from the deep pectoral fascia covering the pectoralis major muscle by a loose layer of connective tissue. A bursa is said by some anatomists to be found there occasionally, but I have never seen it. The loose connective tissue enables the dissection to be carried easily between the gland and the muscle, so that they are quickly separated from one another. The left hand of the operator can now manipulate the breast so as to expose the entire posterior surface of the gland. The gland tissue is covered by the posterior layer of the pectoral fascia, but is readily recognized beneath it, as are also any cysts of tumors which may be present. An incision radiating from the centre to the periphery of the gland should be made through the fascia, to expose the subjacent growth. The segment of the gland containing the tumor should now be removed by two radiating incisions which, meeting at the centre of the gland, include a V-shaped portion of its tissue. (Fig. 2.) The knife should make a clean cut through the gland tissue down to the loose adipose tissue which lies in front of the gland. This adipose layer should not be removed, as its presence is important in preventing a subsequent depression at that point. No attempt should be made to dissect out the tumor, whether it be solid or cystic. Solid tumors, such as the periductal fibroma, or a cystadenoma, are so intimately associated with the gland tissue that they cannot be " shelled out." The fibres of the capsule seem to be continuous with those of the stroma of the gland. Any attempt, therefore, at a dissection of the tumor is followed by a considerable laceration of the surrounding tissues. It is desirable to avoid cutting into the cavity of the cyst, one or two of which are usually found in the same quadrant. Although the contents of the cysts are almost invariably sterile, it is possible that larger cysts may be situated in a portion of the gland system not far removed from the nipple, and that the germs of a future infection may have made their way into their cavities. In the case of a single solid tumor, the V-shaped wound should be carefully approximated with a double row of sutures, one adjusting the anterior edges of the wound and the other its posterior lips. The full thickness of the gland at each side will thus be brought into contact, and no gap left to cause a depression on surface of breast. (Fig. 4.)

In the case of the presence of cysts (in abnormal involution of the breast) a further exploration of the gland tissue is necessary, for although the group of larger cysts forming the tumor for which the operation has been performed, are usually clustered together in one quadrant, there are also numerous minute cysts in other parts of the gland which have escaped detection. If these are left undisturbed they may grow later, and involve a second operation. This complication actually occurred to me. It was, however, in my first case of plastic resection, and led to the adoption of the expedient about to be described.

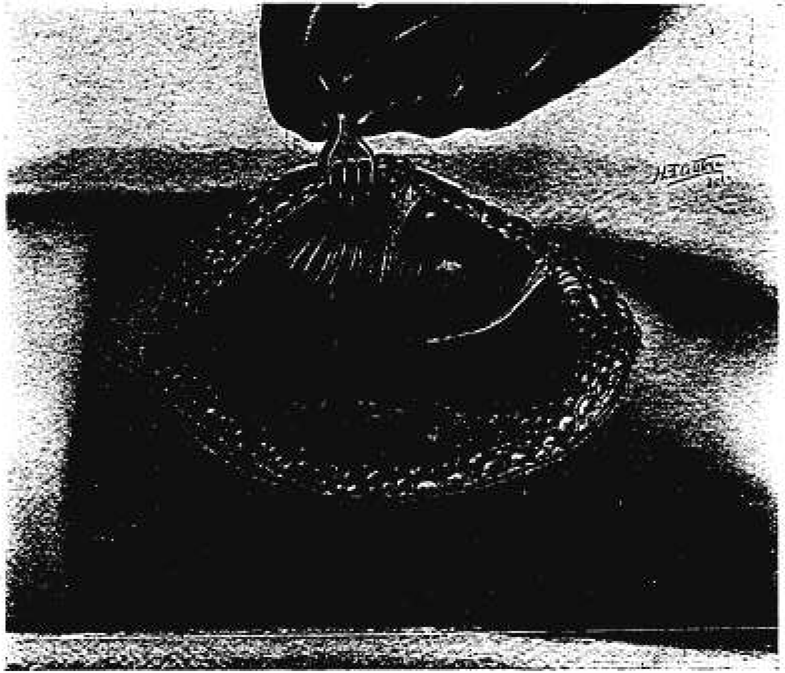
After the removal of the cluster of large cysts by the V-incision, the remaining segments of the gland can be explored by a series of radiating incisions. In this way all the smaller cysts are laid open, a procedure which is sufficient to ensure their permanent disappearance. Cysts the size of a pea can be snipped out with the scissors. Smaller cysts can be left after being laid open. The number of these radiating incisions may vary from three or four to double that number. It depends largely upon the amount of gland tissue present. Many breasts consist of but little else than adipose tissue interspersed with bands of connective tissue. Usually two or three such incisions suffice to satisfy one that the gland has been thoroughly explored. (Fig. 3.)

Fig. 1.



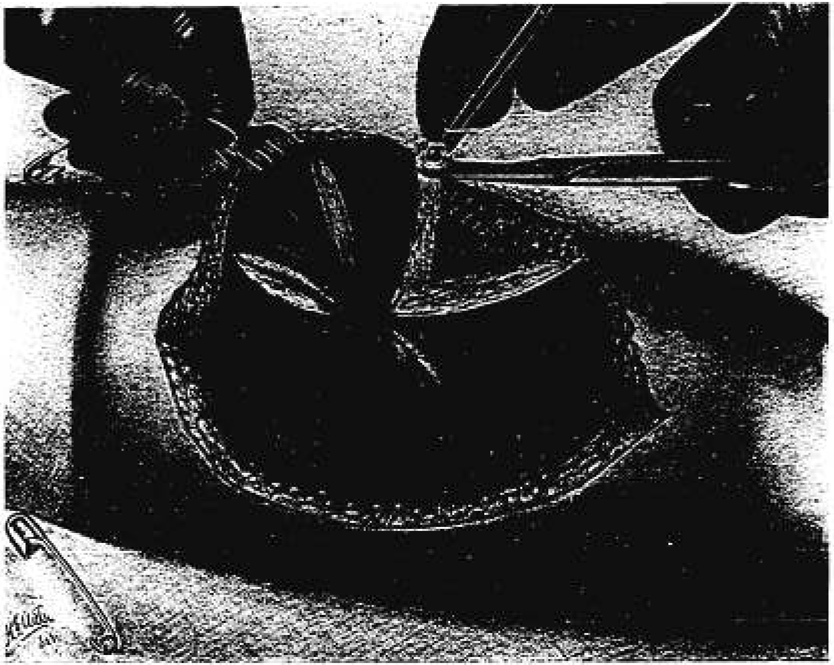
Plastic resection of the mammary glands.—Primary incision.

Fig. 2.



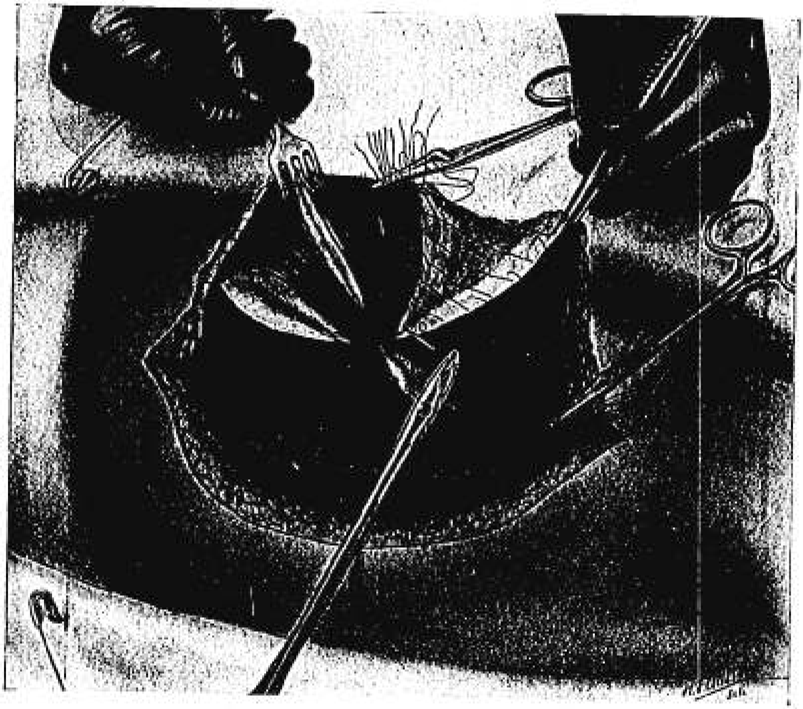
V-incision through posterior wall of gland, for removal of tumor.

FIG. 3.



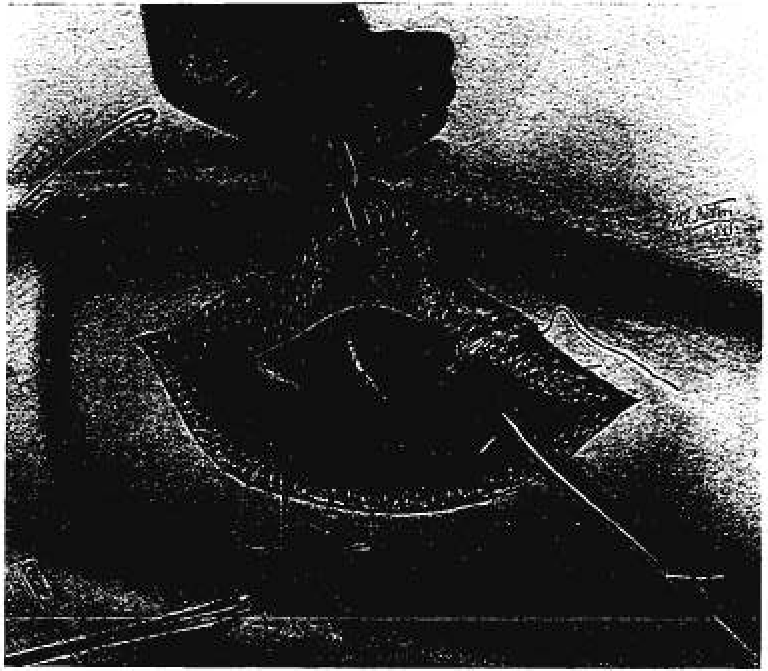
Radiating incisions following removal of large cyst.—Note excision of medium-sized cysts and incision of small cysts.

FIG. 4.



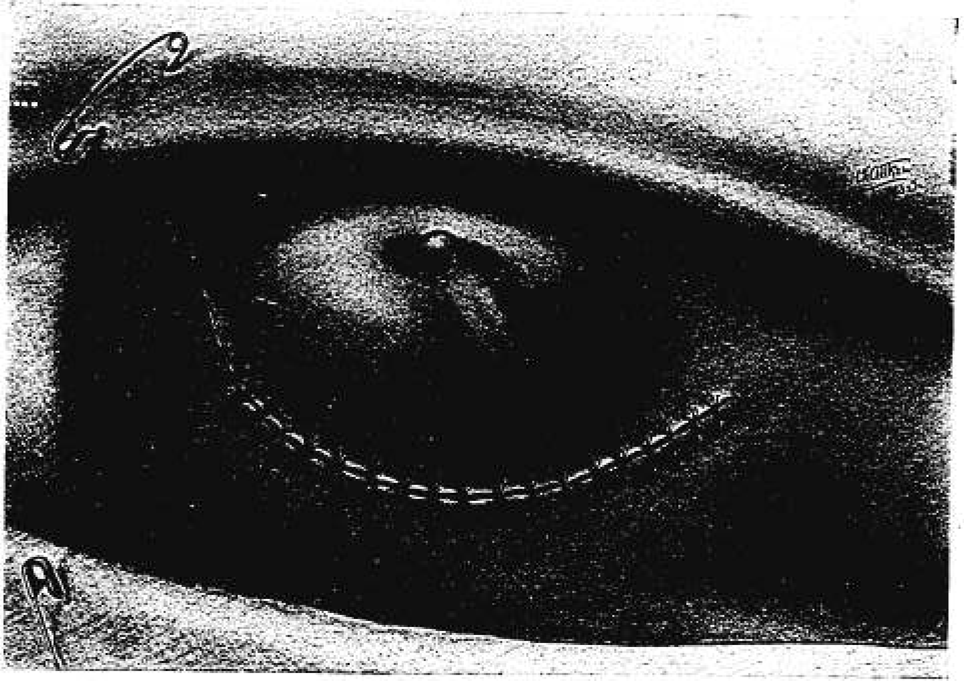
Method of suturing V-shaped wound.

FIG. 5



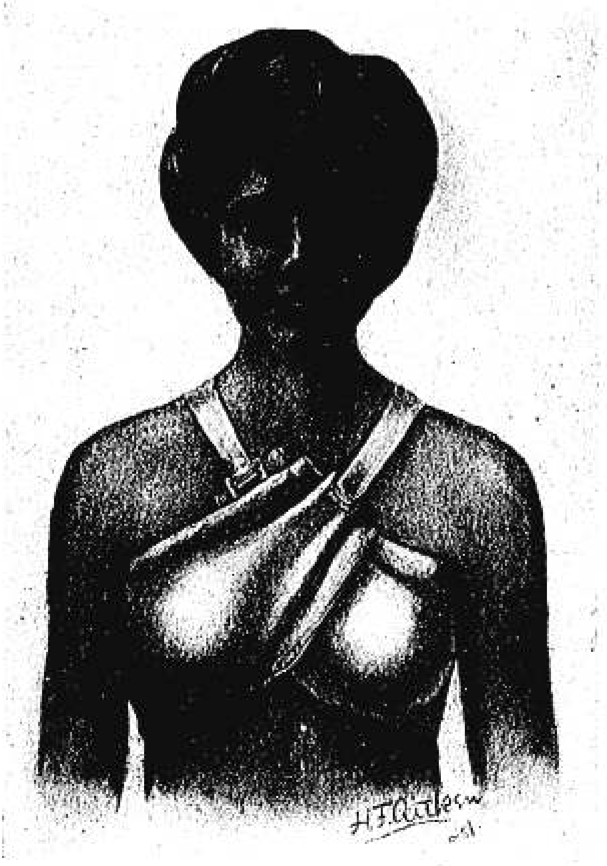
Adjustment of gland to outer edge of pectoral muscle. Note self closure of radiating incisions.

FIG. 6.



Appearance of breast immediately after application of buried sutures and closure of wound. These depressions soon disappear. Note prominence given nipple by purse-string suture.

FIG. 7.



"Empire bandage." Note box plait giving lateral compression.

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In case an operation has been performed for the purpose of settling a doubtful diagnosis of malignant disease, the breast may be sliced almost as freely as a brain is at an autopsy, provided the radiating method is adopted, without danger of interfering with its vitality.

It is usually unnecessary to close these incisions with sutures, as their lips drop together naturally when the organ is folded back on to the pectoral muscle. (Fig. 5.) If, however, any tissue has been dissected out from the sides of one of these incisions it is well to catch the edges together with a single suture. In some operations a very large amount of tissue has to be removed, as in the case of larger cysts, and then it is difficult, if not impossible, to adhere to the radiating system of cutting. Keeping, however, in mind that nothing must be removed except acinous tissue, a great deal of the cortical portion of the gland can be saved and considerable portions of the stroma, and *all* the surrounding adipose tissue of the breast. The somewhat jumbled mass of tissue which remains behind may be so brought together by buried sutures, by the quilting or the purse-string methods of sewing, that a well formed breast may be built up from what is left behind. In some of my early operations I have removed the entire mammary gland, and have been able to build up a breast which had a normal appearance, the contour being preserved permanently. The radiating method, however, does away with the necessity of removing so large an amount of gland tissue.

A second V-shaped incision is occasionally necessary for large cysts in other quadrants, but I have rarely been obliged to resort to it. All hæmorrhage should now be arrested. This can be done partly by pressure and partly by ligature. Catgut is the only material that should be used for this purpose, as silk leaves a more or less permanent knot behind which may act as a source of irritation.

The V-shaped openings should next be sutured in the way above described (Fig. 4), and the gland is now released from the hand of the operator, and dropped back on to the pectoral muscle. It will be found that the various incised portions of the gland resume their natural positions, and fit accurately together. (Fig 5.) A few sutures may be needed to arrest hæmorrhage from small arteries, where the ligature cannot be applied; but this is usually not necessary.

The gland should next be anchored to the outer edge of the fascia of the pectoral muscle. This holds the organ firmly in its place. (Fig. 5.) A second row of sutures should be taken through the deep layer of the superficial fascia before closing the outer edges of the wound with silk-worm gut. This last row of buried sutures is useful in removing strain from the surface sutures.

The outer contour of the breast now appears as a normal breast. Over the site of the V incision there are occasionally one or two deep depressions caused by the buried sutures. (Fig. 6.) This is more marked when a large portion of gland tissue has been removed; but, although in rare cases the buried suture appears to have caused considerable distortion of the breast, as the sutures are absorbed the depression subsequently disappears.

It is not an uncommon occurrence to find a folding in or inversion of the nipple, particularly in a case of abnormal involution (cystic disease). This condition should be distinguished from retraction of the nipple as observed in carcinoma. This deformity can easily be remedied during the operation by dissection from behind, so as to lay bare the base of the nipple, where a purse-string suture can be applied in such a way as to force the nipple outward. (Fig. 6.)

In cases of doubtful tumor, where cancer is suspected, the disease can be approached through the incision made for plastic resection. It is well, however, to carry the incision so as to separate the primary nodule from the lymphatic circulation by extending it a little farther along the axillary border. When the breast is freed from the pectoral muscle, all danger of forcing cancerous juice through the lymphatic channels is averted. If the nodule proves to be cancer, the small cut which has laid it open should be immediately closed by a suture, and the major operation proceeded with immediately. The dissection of the exploratory operation has not been sufficient to prevent the removal in a fairly compact mass, the breast, pectoral muscles and axillary contents. The exploratory skin incision coincides pretty accurately with the outer portion of the pear-shaped incision employed in my operation for cancer. It is, of course, undesirable to open the primary nodule of a cancer of the breast during an operation, if this can be avoided. When it becomes necessary, however, to settle a doubtful diagnosis, every precaution should be taken not to allow the freshly cut diseased surfaces to come in contact with those tissues that are to be left behind.

The term "plastic resection" has been used to describe this operation to call attention to the importance of taking into consideration the anatomical peculiarities of the gland, and its relation to the diseases for which the operation is performed.

The most frequent benign tumors to be operated upon in this way are the periductal fibromata seen so often in young women. As they sometimes become sarcomatous, I always advise operation. In one such tumor of twenty years' duration, I observed the development of carcinoma. When the epithelial tissues predominate to such an extent that we must remove the tumor from the fibrous class, and place it under the epithelial type and call it an adenoma ("fibrocystadenoma") there is still more reason for urging operation. The papillary cyst-adenoma or "duct cancer," the cystic tumor accompanied by a bloody discharge from the nipple, can also be removed by an operation for plastic resection. I have removed several such tumors in this way, without any subsequent sign of recurrénce.

It is necessary to state here that it is my custom to have a pathologist present at the operation, capable of settling definitely the nature of the tumor, and it is worth while always to have the same pathologist if possible. This is not impracticable at the present time when the study of frozen sections, or even of free-hand fresh sections, can be carried on in the operating room. On one occasion only has a mistaken diagnosis, verified later in the examination of the hardened specimen, obliged me to perform a second operation.

The occasional development of cancer in the cysts of an abnormal involution of the breast emphasizes the importance of operative interference for the removal or destruction of all cysts of the mammary gland, whether large or small. As the larger cysts are usually grouped in one quadrant, they are easily removed entire in the wedge-shaped mass included in the V incision. (Fig. 2.) The radiating incisions lay bare the minute cysts dotted here and there throughout the gland, and practically convert the whole gland substance into cicatricial tissue. I have never known a cyst to recur after this operation. Some cysts when laid open exude a cheesy or puriform fluid. This is, however, sterile. When large cysts are opened, it is advisable to flush the wound with saline solution before closing it.

In acute and chronic suppuration of the mammary gland, it is a safer plan to follow such a method as will ensure thorough disinfection and drainage of the infected region. The breast is such a maze of branching canals and of anastomosing lymphatics that only most radical measures will suffice to arrest the burrowing of pus. It is, therefore, often necessary to supplement the original incision by one or more counter openings.

The operation of plastic resection has been performed by me 85 times. The mortality has been nil. In three cases only have I found infection in the wound, and this was attributed in each case to infection from the cavity of the cyst. One was a case of large multiple cysts; another was a large cyst near the nipple, and the third was a case of papillary cystadenoma near the nipple in a woman seventy years of age. I have tested many exposed cysts for bacteria, but have invariably obtained negative results. I should advise the operator to avoid opening the large cysts, if possible, and to use catgut for deep ligatures and sutures, as they are quickly absorbed and leave no trace of their presence in the sensitive structures of the gland. I have had stitch abscess in the skin sutures in two cases only, neither of which was in private practice.

The dressing should be applied so as to produce lateral compression of the lower and upper hemispheres, as the ordinary swathe tends to flatten out the gland and put a strain upon the buried sutures. For this purpose I have devised the "Empire" bandage. The material of the bandage should be of compress cloth or cheviot about 5 inches wide, and long enough to encircle the chest and cross diagonally in front. At the point of crossing it should be caught with a safety pin, and pinned like a diaper. The ends which cross each other at right angles are then folded longitudinally so as to form a "box plait" and are attached to suspenders crossing over the shoulders. (Fig. 7.) A breast supporter has been elaborated for me from this bandage by Messrs. Leach & Greene of Boston. This supporter I have found useful in cases of mastodynia.

The advantages of this operation are the slight risk or discomfort to the patient, who may be assured that it can be performed without a prolonged convalescence and without disfigurement of any kind. In my hands it has proved a satisfactory substitute for the disfiguring exploratory incision on the anterior surface of the breast, for the uncertainty of puncture. and for the mutilation of amputation.

REFERENCES.

[1] Stewart. Jour. of the American Medical Assn., Aug. 6, 1904.
[2] Jour. of the American Medical Assn., July 15, 1905.
[3] T. Gaillard Thomas. N. Y. Med. Jour., April, 1882.